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Teaching Practice of Competition-oriented Garden Design-Build Workshop

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Abstract: *The landscape design course of Shenzhen Polytechnic is based on the Future Garden Competition of Shenzhen Bougainvillea Show to explore teaching reform and improve the four-stage teaching and design process of "proposal-construction drawing-build-report". Based on the students' questionnaire feedback, the competition-oriented design-build workshop model was found to be effective in enhancing learning outcomes and cultivating a full range of landscape design skilled students.*

Keywords: *design competitions; design-build; garden design; teaching practice*

1. Introduction

This study is based on the basic premise of the training objectives of landscape architecture major in Shenzhen Polytechnic, and the orientation of the Shenzhen Bougainvillea Show Future Garden Design Competition, the design-build workshop model of the landscape design course has been reformed to improve the system and teaching support. In order to meet the practical needs of higher education landscape professionals, the workshop will promote the gradual improvement of students' learning and practice process by relying on the theory of the spiral cycle, so as to enhance students' comprehensive quality from design to construction, communication and coordination skills, and bring into play the spirit of craftsmanship to better match the needs of landscape jobs. Professionally, it provides a standard technical and process basis for improving the design-build workshop model for the landscape design course, and also provides practical support for the combination of competition and teaching in modern vocational education in landscape design and construction.

2. Background and reflections on garden design-build workshop

2.1. Reflections on the teaching and learning of landscape design courses

The Landscape Design course is a compulsory course for landscape architecture students to improve their creativity and thinking integration of outdoor spaces and to develop professional knowledge and technical skills that are in line with the position of landscape designer. Chinese universities usually set it up in the second year or above, while European and American institutions such as Germany, the UK and the USA usually set it up from the second semester onwards to the fifth or sixth semester. Characterized by project-based, emphasis on technical training and encouragement of innovation, the curriculum system of some Chinese institutions specializing in landscape architecture takes design classes as the core support point[1] and is supplemented by modules on theory and technology unfolding in the teaching mode of Studio. Institutions at the forefront of the profession in countries such as the USA and Germany often use the Studio model to expand systematic training in theoretical research thinking, or integrate the details of the construction process to deepen the whole process of teaching design to completion.

General landscape design courses are taught in a limited spatial dimension, currently design teaching through plan design and modelling software, and through virtual software such as VR/AR to achieve realistic situational awareness teaching, but not as intuitive as the actual effect of design and construction. In traditional landscape design teaching, students often have to improve their perception of the use of plants and construction materials and the actual spatial scale. The inclusion of construction activities enables students to transition from an understanding to a practical and integrated approach to material technology, spatial structure and construction experience, and to change from a passive acceptance of teaching content to an active exploration process, which is a direction worth exploring.

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2.2. Landscape design-build workshop teaching practice background

In recent years, many universities at home and abroad have introduced the interactive, flexible and open workshop model into the professional classroom[2], through "learning by doing" on real projects, the design, fabrication and construction process is made physical and local, and students are able to develop their communication and problem-solving skills, their ability to master construction schedules and their ability to control project costs.

Many universities, such as the University of Washington in Seattle, USA and the Technical University of Munich, Germany, offer design-build workshops throughout the year, with most of the projects being community parks, park structures, school gardens and other project types, incorporating community multi-participation and digital parametric applications, which are evaluated by students as project courses with a strong sense of participation and achievement. A number of universities in China such as Beijing Forestry University, South China University of Technology and Sichuan University have also joined in the teaching practice of design-build workshops, partly based on competition projects, such as the BFU International Garden Making Festival which has become an annual design and construction event involving over 30 universities in China, with a garden competition designed and built using bamboo as the main material.

3. Competition-oriented garden design-build workflow

How to teach landscape design expertise efficiently within limited teaching hours and meet the needs of society in all aspects is a fundamental topic that needs to be addressed urgently[3]. The competition-based landscape design-build workshop is a teaching experiment that combines goal-oriented and grounded teaching to help students improve their expertise in the whole process of completing landscape design projects, inspire changes in the way design courses are taught, and train skilled people for market demand. The course content uses real design competitions as a teaching task to enhance students' sense of engagement, direction and enthusiasm for learning. The course content starts with the conceptualisation of the theme of scheme design and trains students to think logically and creatively about design. The second stage aims to deepen the design and complete a set of construction drawings. The third stage focuses on material procurement, tracking costs and completing the construction on the ground.

The landscape design teaching team of Shenzhen Polytechnic chose the Shenzhen Bougainvillea Show Future Garden Design Competition as their course assignment and completed workshop teaching activities to coincide with the competition time. The 2021 Shenzhen Bougainvillea Show Future Garden Competition is design-based, with construction work done by a professional builder and students cooperating with construction site guidance. Students generally reported that the builder did not follow the design exactly, that materials had to be replaced due to construction constraints, and that the finished product was unsatisfactory. In 2022, it is proposed to the organizers to change to a design-build competition to strengthen the articulation process from drawing to implementation and to exercise the overall professionalism of students in all aspects. During the teaching process, the teaching design is refined with the competition process and time in mind, and the content and arrangement of the teaching is reshaped (Figure 1). According to the competition process in the scheme stage you need to complete an A1 size drawing, including the design theme, master plan, plant design, rendering, construction estimate, etc. In this stage teaching design 4 hours per week, 4 weeks of time to complete the scheme design. After expert assessment to determine the selected scheme entries, the teaching elements such as construction drawing design, material preparation and budgeting are carried out. Complete the booking and procurement of materials to control the cost of the garden prior to centralized construction on site. The site construction phase requires the development of a construction plan and the completion of modules such as garden structures, paving, plants and furniture as planned. The evaluation of the whole course is divided into a process evaluation and a final evaluation, with the process evaluation of the design and construction process from phase 1 to phase 3 and the debriefing of phase 4 as a final evaluation task.

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Figure 1: Competition-oriented design-build workshop organizational framework

4. Design-build teaching practice of competition work“Books Are Unfolded Like Blossoming Flowers”

Using the selected construction work of the Future Garden of the 2022 Shenzhen Bougainvillea Show, "Books are unfolded like blossoming flowers" as a practical exploration, the step-by-step teaching process subdivides the garden design and construction tasks into a planned cognitive learning of garden design and exploration of construction methods to experience the pedagogical reform and feedback brought by the design-build workshop model.

4.1. Scheme design

Figure 2: Scheme design rendering of “Books are unfolded like blossoming flowers” work

The Future Garden Competition for the 2022 Shenzhen Bougainvillea Show requires designers to design and build a balcony garden within a limited plot of land. The Future Garden exhibition area consists of eight plots, with the participation of four universities - Shenzhen University, Shenzhen Polytechnic, Shenzhen Institute of Information Technology and Shenzhen Institute of Technology - each of which designed and built two exhibition gardens, to be judged on the final completed effect. The competition entries are recommended to use recyclable materials to improve the recycling rate of the exhibition garden and to enhance the promotion of ecological protection and sustainable development. In the pre-workshop period, 10-12 students from Shenzhen Polytechnic were divided into four groups to work on the design of the programme. The students' design thinking and logic were guided by heuristic teaching methods, and brainstorming was carried out through sketches, models and other means. The exhibition garden was created around the theme and requirements of the competition, and two groups of proposals were selected by experts to enter the construction process. Take one of the selected works, “Books are unfolded like blossoming flowers”, as an example, a low-carbon interactive balcony garden may be created that encourages reading for everybody. The Tingbu lettering, which is written on bamboo slips and scanned as code to decode, is found in the first section of book antiquity. Books are given a second life through recycling. The history of books is divided into two sections. The location also hosts a "flowers for books" exchange program. People trade their used books for green plants or flowers, which

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not only freshens up houses with the aroma of flowers and greenery but also gives them a new lease on life. The interaction promotes Shenzhen's cultural history as a city of books and offers a beautiful image of reading, dream-building, and civilized living. (Figure 2)

4.2. Detail deepening

According to the requirements of the competition, the cost of each garden should not exceed 37,500 Yuan and suitable materials and construction practices should be selected. The main constructions and calligraphic fabrics in the work, the materials, colours and prices are all key factors in the execution. The two groups of students who were not shortlisted rejoined to participate in the deepening of the design and construction of the selected proposal. Through a guided teaching approach, multiple sources of suppliers are provided for students to spontaneously compare prices, quality of materials and delivery lead times. One of the difficulties in the construction of the work “Books are unfolded like blossoming flowers” was the need to consider the durability of the calligraphic fabric to be hung in weather conditions, and after multiple comparisons of samples, a wooden structure combined with a non-woven fabric was chosen for the construction (Figure 3). The objective of this stage is to complete a set of construction drawings of the exhibition garden with the aim of actual construction, to refine the specific technical points and how to ensure high quality and efficient construction details.

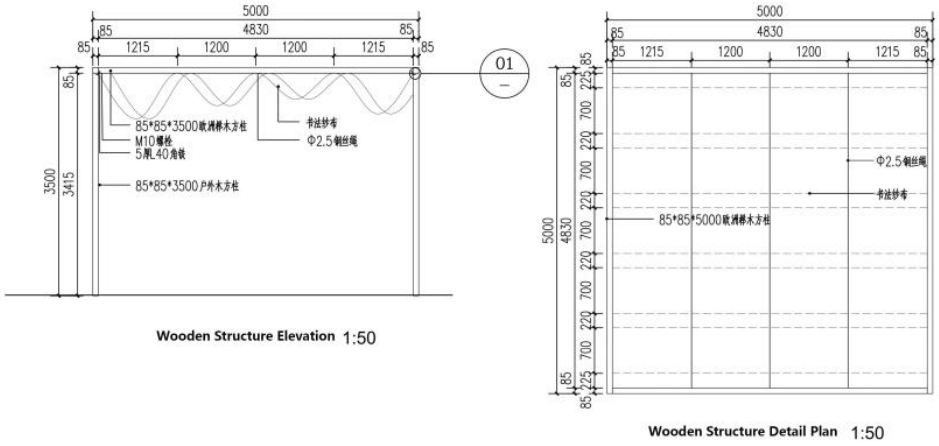

Figure 3: Structural construction drawings of “Books are unfolded like blossoming flowers” work

4.3. Material testing and construction process

The construction of the work is divided into two main parts. Furniture, wooden platforms and structural columns are processed and cut in advance at the school's landscape engineering training site, and the construction work is mainly carried out on site for the installation of the component parts, paving and planting. The time frame for intensive construction was tight, with the organisers requiring around 10 days to complete the construction, and teachers guided students to plan their construction well in advance. Problems encountered during the construction process were considered and discussed by the students to come up with solutions, which greatly motivated the students to explore their expertise on their own. The wooden structure was tested several times on site to determine how to fix the fabric in a reasonable and aesthetically pleasing way. Compared to designing on a computer model, the realistic construction was able to improve the students' perception of spatial and aesthetic sense. There is a gap between the drawings and the site perception of planting design. The process of "design - procurement of plant materials - site placement and adjustment - maintenance and management" strengthens the students' professional knowledge of plant design and understands the importance of site construction, providing valuable experience for other types of project design in the future. (Figure 4)

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Figure 4: Construction process *of "Books are unfolded like blossoming flowers" work*

4.4. Presentation and summary

After the construction of the work, 1-2 student representatives make an actual presentation of the work to the expert jury, which also serves as the final evaluation for the end of the course. The work successfully completed the transition from drawing to physical construction and was well received by the organisers at the awards ceremony and by the public during the exhibition, boosting the students' sense of achievement and identification with their profession. After the course questionnaire feedback on the effectiveness of the teaching, more than 95% of the students felt that the competition as a course task objective was more motivating and that participation in the design-build competition for real projects gave a more three-dimensional and emotional understanding of professional learning.

5. Conclusions

After about two years of practical exploration of the competition, the design-build competition-oriented landscape design teaching has effectively improved the problems of outdated course content, rigid procedures and low student enthusiasm for learning. The use of diversified multi-perspective and multi-stage inspirational guidance, the teacher-student collaboration model is throughout the teaching process, no longer in a teacher-talk, student-do approach, but in an effective way to motivate students to complete the project tasks. The design-build competition combined with the professional curriculum provides a good practical reference for reforming the landscape design curriculum and exploring workshop-type courses in vocational education.

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Figure 1 is drawn by the author, figure 2 and 3 are drawn by students of "Books are unfolded like blossoming flowers" group, and figure 4 is photographed by the author and students.

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